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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,277	12/31/2003	Tae-wan Kim	249/409	6602
27849	7590	02/08/2007		
LEE & MORSE, P.C. 3141 FAIRVIEW PARK DRIVE SUITE 500 FALLS CHURCH, VA 22042			EXAMINER ALEJANDRO MULERO, LUZ L	
			ART UNIT	PAPER NUMBER
			1763	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/748,277

Applicant(s)

KIM ET AL.

Examiner

Luz L. Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2006 and 16 November 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-12 and 14-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 4-12, 14-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/17/06 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4, 11-12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., WO 00/00993.

Chen et al. shows the invention as claimed including an inductively coupled antenna 600 for installation on a reaction chamber of an inductively coupled plasma processing apparatus and for connection to a radio frequency power source to induce an electric field for ionizing a reactant gas injected into the reaction chamber and for generating plasma, the inductively coupled antenna comprising a coil having a plurality of turns including an outermost turn and a plurality of inner turns, wherein a current

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flowing through the outermost turn is larger than a current flowing through the plurality of inner turns as adjusted by the capacitors (see fig. 6 and its description).

Chen et al. is applied as above but does not expressly disclose wherein a sum of the lengths of the plurality of inner turns is longer than a length of the outermost turn. However, a prima facie case of obviousness exists because, where the only difference between the prior art and the claims was a recitation of relative dimensions of the apparatus and an apparatus having the claimed relative dimensions would not perform differently than the prior art apparatus, the claimed apparatus is not patentably distinct from the prior art apparatus. Moreover, it would have been obvious to one of ordinary skill in the art to determine through routine experimentation the optimum lengths of the coils based upon a variety of factors including the desired plasma distribution and such limitation would not lend patentability to the instant application absent a showing of unexpected results.

With respect to claims 2 and 12, the outermost turn and the plurality of inner turns are connected to the RF power supply in parallel and the plurality of inner turns are connected to each other in series.

Regarding claims 4 and 14, the plurality of turns are concentrically formed.

Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., WO 00/00993 as applied to claims 1-2, 4, 11-12, and 14 above, and further in view of admitted prior art.

Chen et al. is applied as above but does not expressly disclose wherein the plurality of turns is formed of a single conductive line. Admitted prior art discloses an antenna with a plurality of turns that is formed of a single conductive line (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Chen et al. so as to form the coils from a single conductive line because the admitted prior art shows that it is well known in the art to form a coil comprised of a plurality of turns from a single conductive line.

Claims 6-10 and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al., WO 00/00993 as applied to claims 1-2, 4, 11-12, and 14 above, and further in view of Sugai et al., U.S. Patent 5,560,776 and Ishizuka et al., U.S. Patent 5,531,834.

Chen et al. is applied as above but does not expressly disclose a conductive metal tube of copper having a cooling path, and a conductive metal strip that is electrically and thermally connected to the conductive metal tube and is coextensive with the conductive metal tube. Sugai et al. discloses a conductive metal tube 1 and a conductive metal strip 5 that is electrically and thermally connected to the conductive metal tube and is coextensive with the conductive metal tube (see figs. 1-3b and their descriptions). Furthermore, Ishizuka et al. discloses a coil that is a conductive metal tube and is composed of copper with a cooling path (see col. 6-line 57 to col. 7-line 9). In view of these disclosures, it would have been obvious to one of ordinary skill in the

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art at the time the invention was made to modify the apparatus of Chen et al. so as to include the coil configuration as suggested by Sugai et al. and Ishizuka et al. because such a configuration reduces contamination, produces a high frequency electric field, and allows the temperature of the coil to be carefully controlled.

Concerning claims 8 and 18, note that the apparatus of Chen et al. modified by Sugai et al. and Ishizuka et al. contains a conductive metal tube with a circular cross-section.

With respect to claims 9-10 and 19-20, the configuration of the claimed conductive metal strip is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the claimed configuration is significant. Furthermore, concerning the height of the conductive metal strip changing from a center portion to the edge portion of the antenna, such limitation represents an obvious choice of design and it would have been obvious to one of ordinary skill in the art to determine through routine experimentation the optimum height of the metal strip based upon a variety of factors including the desired inductive coupling and such limitation would not lend patentability to the instant application absent a showing of unexpected results or persuasive evidence that the claimed configuration is significant.

Response to Arguments

Applicant's arguments filed 11/16/06 have been fully considered but they are not persuasive.

The declaration under 37 CFR 1.132 filed 11/16/06 is insufficient to overcome the 35 U.S.C. 103 rejection of claims 1-2, 4-5, 11-12 based at least in part upon Chen et al. as set forth in the last office action because: the declaration does not consist of sufficient objective evidence such as unexpected results to overcome the prima facie case of obviousness established by the examiner. The examiner continues to contend that a prima facie case of obviousness exists because, where the only difference between the prior art and the claims was a recitation of relative dimensions of the apparatus and an apparatus having the claimed relative dimensions would not perform differently than the prior art apparatus, the claimed apparatus is not patentably distinct from the prior art apparatus. Moreover, it would have been obvious to one of ordinary skill in the art to determine through routine experimentation the optimum lengths of the coils based upon a variety of factors including the desired plasma distribution and such limitation would not lend patentability to the instant application absent a showing of unexpected results.

Additionally, applicant states that Chen et al. discloses having the lengths of the inner and outer coils *substantially* the same and therefore teaches away from the invention as claimed. However, the invention as claimed merely states that the inner coils have a greater length than only the outermost turn and therefore a statement regarding the outer and inner coils in their totality does not appear to address the claimed invention. Moreover, the phrase *substantially* is a broad term and could be taken to mean that the inner coil has a slightly larger length than the outermost turn.

Applicant's arguments with respect to the rejection of claims 6-10 and 16-22 under 35 USC 112, first paragraph, are persuasive and therefore this rejection is withdrawn.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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A handwritten signature in black ink, appearing to read 'Luz L. Alejandro', written in a cursive style.

Luz L. Alejandro
Primary Examiner
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February 5, 2007